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File 154:MEDLINE(R) 1993-2000/May W2
         (c) format only 2000 Dialog Corporation

Set     Items   Description
S1      31958   IFN OR INTERFERON
S2     268979   TYPE()I OR ALPHA OR BETA
S3     222794   RECEPTOR?
S4         93   IFNAR?
S5       1132   (S1(4N)S3 AND S2) OR S4
S6     171635   COMPLEX OR CONJUGATE OR FUSION OR FUSED
S7         55   S5 AND S6(2N)S1
       22mar00 11:06:32
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File  34:SciSearch(R) Cited Ref Sci 1990-2000/Mar W2
         (c) 2000 Inst for Sci Info
File  73:EMBASE 1974-2000/Mar W1
         (c) 2000 Elsevier Science B.V.
File 155:MEDLINE(R) 1966-2000/May W2
         (c) format only 2000 Dialog Corporation
File   5:Biosis Previews(R) 1969-2000/Mar W3
         (c) 2000 BIOSIS
File 349:PCT FULLTEXT 1983-2000/UB=, UT=20000210
         (c) 2000 WIPO/Micropatent
File 434:SciSearch(R) Cited Ref Sci 1974-1989/Dec
         (c) 1998 Inst for Sci Info
File 654:US Pat.Full. 1990-2000/Mar 14
         (c) format only 2000 The Dialog Corp.
File  76:Life Sciences Collection 1982-2000/Jan
         (c) 2000 Cambridge Sci Abs
File 399:CA SEARCH(R) 1967-2000/UD=13212
         (c) 2000 American Chemical Society
File 348:European Patents 1978-2000/Mar W02
         (c) 2000 European Patent Office

Set     Items   Description
S1     367242   IFN OR INTERFERON
S2    4220248   TYPE()I OR ALPHA OR BETA
S3    2822197   RECEPTOR?
S4        591   IFNAR?
S5      11193   (S1(4N)S3 AND S2) OR S4
S6    2964113   COMPLEX OR CONJUGATE OR FUSION OR FUSED
S7        463   S5 AND S6(2N)S1
S8        308   RD (unique items)
S9         62   S8/1996-1997
S10   172243   S6/TI OR S6/AB
S11       164   S8 AND S10
S12       132   S11 NOT S9
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File 348:European Patents 1978-2000/Mar W02
         (c) 2000 European Patent Office
File 349:PCT FULLTEXT 1983-2000/UB=, UT=20000210
         (c) 2000 WIPO/Micropatent

Set     Items   Description
S1       9959   IFN OR INTERFERON
S2     136477   TYPE()I OR ALPHA OR BETA
S3      43848   RECEPTOR?
S4         22   IFNAR?
S5        471   (S1(4N)S3 AND S2) OR S4
S6     214668   COMPLEX OR CONJUGATE OR FUSION OR FUSED
S7         62   S5 AND S6(2N)S1
S8     295950   COMPLEX? OR CONJUGAT? OR FUSION? OR FUSING OR FUSED OR COV-
              ALENT? OR CROSS()LINK?
S9         442  S5 AND S8
S10        598  S1/TI
S11       5487  S3/TI OR S4/TI
S12      12153  S8/TI
S13          2  S10 AND S11 AND S12
S14         21  S10 AND S11 AND S8
       22mar00 13:28:38       22mar00 11:47:04
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File 154:MEDLINE(R) 1993-2000/May W2
         (c) format only 2000 Dialog Corporation

Set     Items   Description
S1      31958   IFN OR INTERFERON
S2     268979   TYPE()I OR ALPHA OR BETA
S3     222794   RECEPTOR?
S4         93   IFNAR?
S5       1132   (S1(4N)S3 AND S2) OR S4
S6     171635   COMPLEX OR CONJUGATE OR FUSION OR FUSED
S7         55   S5 AND S6(2N)S1
S8       2926   SOLUBLE(2N)S3
S9         68   S5 AND S8
S10         2   S9 AND DT=REVIEW
       22mar00 15:20:06
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	L #	Hits	Search Text	DBs
1	L1	7743	interferon or ifn	USPAT
2	L2	186	(1 adj3 receptor$1) or ifnar$2	USPAT
3	L3	2235310	3.clm.	USPAT
4	L5	24	(IFNAR$2 OR (1 ADJ3 RECEPTOR$1)).clm.	USPAT

USES THEREOF
PROTEINE CHIMERE DU RECEPTEUR D'INTERLEUKINE-6 SOLUBLE/LIGAND, ANALOGUES DE CELLE-CI ET APPLICATIONS
Patent Applicant/Assignee:
YEDA RESEARCH AND DEVELOPMENT CO LTD; Address - YEDA RESEARCH AND DEVELOPMENT CO. LTD. , Weizmann Institute of Science, P.O. Box 95, 76100 Rehovot , IL
Inventor(s):
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LAPIDOT Tsvee; Address - LAPIDOT, Tsvee , Rehov Boxer 6, 74046 Ness-Ziona , IL
KOLLET Orit; Address - KOLLET, Orit , Rehov Ramat Chen 14, 52232 Ramat Gan , IL
Patent and Priority Information (Country, Number, Date):
Patent: WO 9902552 A2 19990121
Application: WO 98IL321 19980709 (PCT/WO IL9800321)
Priority Application: IL 121284 19970710; IL 122818 19971230
Designated States: AL; AM; AT; AU; AZ; BA; BB; BG; BR; BY; CA; CH; CN; CU; CZ; DE; DK; EE; ES; FI; GB; GE; GH; GM; HR; HU; ID; IL; IS; JP; KE; KG; KP; KR; KZ; LC; LK; LR; LS; LT; LU; LV; MD; MG; MK; MN; MW; MX; NO; NZ; PT; RO; RU; SD; SE; SG; SI; SK; SL; TJ; TM; TR; TT; UA; UG; US; UZ; YU; ZW; GH; GM; KE; LS; MW; SD; SZ; UG; ZW; AM; AZ; BY; KG; KZ; MD; TJ; TM; AT; BE; CH; CY; DE; DK; ES; FI; FR; GB; GR; IE; IT; LU; MC; PT; SE; BF; BJ; CF; CG; CI; CM; GA; GN; GW; ML; MR; NE; SN; TD; TG
Publication Language: English
Filing Language: English
Fulltext Word Count: 16466

English Abstract
Chimeric proteins constructed from the fusion of the naturally occurring form of the soluble IL-6 receptor and IL-6 which are useful for treatment of cancer and liver disorders, enhancement of bone marrow transplantation, and treatment of other IL-6 related conditions are provided.

French Abstract
Ces proteines chimeres obtenues grace a la fusion de la forme d'origine naturelle du recepteur d'IL-6 soluble et d'IL-6, se revelent efficaces en matiere de therapie anticancereuse et de traitement de troubles hepatiques, d'amelioration de la greffe de moelle osseuse ainsi que de traitement d'autres troubles lies a l'IL-6.

12/3,AB/118 (Item 12 from file: 399)
DIALOG(R)File 399:CA SEARCH(R)
(c) 2000 American Chemical Society. All rts. reserv.

[illegible]3315 CA: 122(21)263315b JOURNAL
[illegible]logy model of human interferon-.alpha.8 and its receptor complex
AUTHOR(S): Seto, Marian H.; Harkins, Richard N.; Adler, Marc; Whitlow, Marc; Church, Bret W.; Croze, Ed
LOCATION: Protein Biochem. Biophys., Berlex Biosci., Richmond, CA, 94804, USA
JOURNAL: Protein Sci. DATE: 1995 VOLUME: 4 NUMBER: 4 PAGES: 655-70
CODEN: PRCIEI ISSN: 0961-8368 LANGUAGE: English

12/3,AB/128 (Item 22 from file: 399)
DIALOG(R)File 399:CA SEARCH(R)
(c) 2000 American Chemical Society. All rts. reserv.

105224075 CA: 105(25)224075c JOURNAL
Extraction of alpha interferon-receptor complexes with digitonin
AUTHOR(S): Eid, Pierre; Mogensen, Knud Erik
LOCATION: Lab. Oncol. Virale, Inst. Rech. Sci. Cancer, 94802, Villejuif, Fr.
JOURNAL: Methods Enzymol. DATE: 1986 VOLUME: 119 NUMBER: Interferons, Pt. C PAGES: 347-51 CODEN: MENZAU ISSN: 0076-6879 LANGUAGE: English

12/3,AB/129 (Item 23 from file: 399)
DIALOG(R)File 399:CA SEARCH(R)
(c) 2000 American Chemical Society. All rts. reserv.

104086869 CA: 104(11)86869r JOURNAL
Receptors for human interferon-alpha: two forms of interferon-receptor complexes identified by chemical cross-linking
AUTHOR(S): Raziuddin, Arati; Gupta, Sohan L.
LOCATION: Mem. Sloan-Kettering Cancer Cent., New York, NY, 10021, USA
JOURNAL: Prog. Clin. Biol. Res. DATE: 1985 VOLUME: 202 NUMBER: 2-5A Syst. PAGES: 219-26 CODEN: PCBRD2 ISSN: 0361-7742 LANGUAGE: English

File 34:SciSearch(R) Cited Ref Sci 1990-2000/Mar W2
(c) 2000 Inst for Sci Info
File 73:EMBASE 1974-2000/Mar W1
(c) 2000 Elsevier Science B.V.
File 155:MEDLINE(R) 1966-2000/May W2
(c) format only 2000 Dialog Corporation
File 5:Biosis Previews(R) 1969-2000/Mar W3
(c) 2000 BIOSIS
File 349:PCT FULLTEXT 1983-2000/UB=, UT=20000210
(c) 2000 WIPO/Micropatent
File 434:SciSearch(R) Cited Ref Sci 1974-1989/Dec
(c) 1998 Inst for Sci Info
File 654:US Pat.Full. 1990-2000/Mar 14
(c) format only 2000 The Dialog Corp.
File 76:Life Sciences Collection 1982-2000/Jan
(c) 2000 Cambridge Sci Abs
File 399:CA SEARCH(R) 1967-2000/UD=13212
(c) 2000 American Chemical Society
File 348:European Patents 1978-2000/Mar W02
(c) 2000 European Patent Office

Set	Items	Description
S1	367242	IFN OR INTERFERON
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S4	591	IFNAR?
S5	11193	(S1(4N)S3 AND S2) OR S4
S6	2964113	COMPLEX OR CONJUGATE OR FUSION OR FUSED
S7	463	S5 AND S6(2N)S1
S8	308	RD (unique items)
S9	62	S8/1996-1997
S10	2172243	S6/TI OR S6/AB
S11	164	S8 AND S10
S12	132	S11 NOT S9

12/3,AB/21 (Item 21 from file: 34)
DIALOG(R)File 34:SciSearch(R) Cited Ref Sci
(c) 2000 Inst for Sci Info. All rts. reserv.

03888508 Genuine Article#: QN635 Number of References: 49
Title: CHARACTERIZATION OF A DOMAIN OF A HUMAN TYPE- I INTERFERON RECEPTOR PROTEIN INVOLVED IN LIGAND-BINDING
Author(s): EID P; TOVEY MG
Corporate Source: INST RECH CANC,VIRAL ONCOL LAB,CNRS,UPR 9045,7 RUE GUY MOQUET BP8/F-94801 VILLEJUIF//FRANCE/
Journal: JOURNAL OF INTERFERON AND CYTOKINE RESEARCH, 1995, V15, N3 (MAR), P205-211
ISSN: 1079-9907
Language: ENGLISH Document Type: ARTICLE
Abstract: Two monoclonal antibodies that recognize different epitopes of the extracellular domain of one of the proteins that constitute the type I interferon receptor were used to delineate the interferon binding site. Antibody 64G12 both inhibits the binding of radiolabeled interferon-alpha (2) and IFN-alpha (8) to their cell surface receptors and neutralizes the antiviral and antiproliferative actions of all the type I interferons tested, including IFN-beta , IFN-omega, and human leukocyte IFN, a mixture of different interferon-alpha isotypes, Antibody 34F10 recognizes the type I interferon [illegible]ceptor with an affinity similar to that of the MAb 64G12 but does [illegible]ot inhibit either the binding or the biologic activity of any of the type I interferons tested, Both antibodies recognize a protein of 105 +/- 5 kD from either Daudi or Ly28 cells, Immunoprecipitation following surface iodination demonstrated that the neutralizing MAb recognizes a protein of 105 kD and the nonneutralizing MAb a protein of 110 kD in extracts of Daudi cells. A second less intense band was also detected by both antibodies. Cross-linking of IFN -alpha (2) to its receptor before immunoprecipitation prevented the neutralizing antibody from immunoprecipitating the receptor protein, but the nonneutralizing MAb was still able to recognize a 140 kD protein corresponding to the cross-linked interferon -receptor protein complex . Thus, an interferon binding domain appears to be localized in a region between amino acids 23 and 229 of the extracellular domain of a transmembrane protein that forms part of the type I interferon receptor complex containing the epitopes recognized by each antibody.

12/3,AB/34 (Item 34 from file: 34)
DIALOG(R)File 34:SciSearch(R) Cited Ref Sci
(c) 2000 Inst for Sci Info. All rts. reserv.

01957355 Genuine Article#: JP583 Number of References: 0
(NO REFS KEYED)
Ti[illegible]: SERUM INTERLEUKIN-2 RECEPTOR AND INTERFERON- ALPHA LEVELS IN A [illegible]IENT WITH ALLERGIC GRANULOMATOUS-ANGIITIS (CHURG-STRAUSS)
Author(s): HAYASAKA T; SASAKI H; SUGAWARA T; YASUURA S; KAWAMURA T
Corporate Source: HAKODATE CHUO HOSP,DEPT INTERNAL MED,33-2 HONCHO/HAKODATE 040//JAPAN/
Journal: INTERNAL MEDICINE, 1992, V31, N7 (JUL), P955-959
ISSN: 0021-5120
Language: ENGLISH Document Type: ARTICLE
Abstract: A patient with allergic granulomatous angiitis accompanied by increases in serum interleukin-2 receptor (IL-2R) and interferon -alpha (IFN-alpha) levels is reported. Laboratory findings revealed leukocytosis with eosinophilia and increased serum IgE and IgG. The serum IL-2R and IFN-alpha were increased. The serum immune complex , interferon -beta , -gamma and complements remained at normal levels. The serum IgE, IgG, IL-2R and IFN-alpha correlated with disease activity. Immunofluorescent studies using frozen sections obtained from the dermal lesion showed no immunoglobulin or complement deposits on vascular walls. Measurements of serum IL-2R and IFN-alpha might be considered reliable serologic indicators of disease activity.

12/3,AB/89 (Item 3 from file: 349)
DIALOG(R)File 349:PCT FULLTEXT
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00649150
IFNAR2/ IFN COMPLEX
COMPLEXE IFNAR2/IFN
Patent Applicant/Assignee:
APPLIED RESEARCH SYSTEMS ARS HOLDING NV; Address - APPLIED RESEARCH SYSTEMS ARS HOLDING N.V. , 14 John B. Gorsiraweg, Curacao , AN
MCINNIS Patricia G; Address - MCINNIS, Patricia, G. , Apt. &203, 2325 42nd Street, N.W., Washington, DC 20007 , US
Inventor(s):
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SHERRIS David; Address - SHERRIS, David , 37 Nellian Crescent, Jamaican Plain, MA 02130 , US
EL TAYAR Nabil; Address - EL TAYAR, Nabil , 143 Gerald Road, Milton, MA 02186 , US
MCKENNA Sean; Address - MCKENNA, Sean , 679 Lincoln Street, Ducksberry, MA 02332 , US
Patent and Priority Information (Country, Number, Date):
Patent: WO 9932141 A1 19990701
Application: WO 98US26926 19981218 (PCT/WO US9826926)
Priority Application: US 9768295 19971219
Designated States: AL; AM; AT; AU; AZ; BA; BB; BG; BR; BY; CA; CH; CN; CU; CZ; DE; DK; EE; ES; FI; GB; GD; GE; GH; GM; HR; HU; ID; IL; IN; IS; JP; KE; KG; KP; KR; KZ; LC; LK; LR; LS; LT; LU; LV; MD; MG; MK; MN; MW; MX; NO; NZ; PL; PT; RO; RU; SD; SE; SG; SI; SK; SL; TJ; TM; TR; TT; UA; UG; UZ; VN; YU; ZW; GH; GM; KE; LS; MW; SD; SZ; UG; ZW; AM; AZ; BY; KG; KZ; MD; RU; TJ; TM; AT; BE; CH; CY; DE; DK; ES; FI; FR; GB; GR; IE; IT; LU; MC; NL; PT; SE; BF; BJ; CF; CG; CI; CM; GA; GN; GW; ML; MR; NE; SN; TD; TG
Publication Language: English
Filing Language: English
Fulltext Word Count: 16598

English Abstract
The < i> in vivo < /i> effect of Type I interferon (IFN) can be prolonged by administering the interferon in the form of a complex with an IFN binding chain of the human interferon &alpha ;/&beta ; receptor (IFNAR). Such a complex also improves the stability of the IFN and enhances the potency of the IFN . The complex may be a non-covalent complex or one in which the IFN and the IFNAR are bound by a covalent bond or a peptide. When bound by a peptide bond in the form of a fusion protein, the IFN may be separated from the IFNAR by means of a peptide linker. Such a fusion protein may be produced by recombinant DNA technology. Storing IFN in the form of such a complex improves the storage life of the IFN and permits storage under milder conditions than would otherwise be possible.

French Abstract
L'invention concerne la prolongation de l'effet < i> in vivo < /i> de l'interferon de type I (IFN) par administration de l'interferon sous forme de complexe avec une chaine de liaison d'IFN du recepteur de l'interferon humain &alpha ;/&beta ; (IFNAR). Ce complexe permet egalement d'ameliorer la stabilite de l'IFN et augmente la puissance de l'IFN. Le complexe peut etre un complexe non covalent ou un complexe dans lequel l'IFN et l'IFNAR sont lies par une liaison covalente ou un peptide. Lorsqu'ils sont lies par une liaison peptidique sous la forme d'une proteine de fusion , l'IFN peut etre separe de l'IFNAR par un lien peptidique. On peut produire cette proteine de fusion au moyen d'une technique de recombinaison de l'ADN. La conservation de l'IFN sous la forme d'un tel complexe permet d'augmenter la duree de conservation de l'IFN et de le conserver dans de meilleures conditions qu'il n'aurait ete possible autrement.
?t 12/u1/92,118,128,129; show files; ds; log hold

12/3,AB/92 (Item 6 from file: 349)
DIALOG(R)File 349:PCT FULLTEXT
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00619521
CHIMERIC INTERLEUKIN-6 SOLUBLE RECEPTOR/LIGAND PROTEIN, ANALOGS THEREOF AND

7/3,AB/4
DIALOG(R)File 154:MEDLINE(R)

10231462 99421331
Characterization of a soluble ternary complex formed between human interferon- beta-1a and its receptor chains.
Arduini RM; Strauch KL; Runkel LA; Carlson MM; Hronowski X; Foley SF; Young CN; Cheng W; Hochman PS; Baker DP
Biogen Inc., Cambridge, Massachusetts 02142, USA.
Protein Sci (UNITED STATES) Sep 1999, 8 (9) p1867-77, ISSN 0961-8368 Journal Code: BNW
Languages: ENGLISH
Document type: JOURNAL ARTICLE
The extracellular portions of the chains that comprise the human type I interferon receptor , IFNAR1 and IFNAR2 , have been expressed and purified as recombinant soluble His-tagged proteins, and their interactions with each other and with human interferon-beta -1a (IFN-beta -1a) were studied by gel filtration and by cross-linking. By gel filtration, no stable binary complexes between IFN- beta -1a and IFNAR1 , or between IFNAR1 and IFNAR2 were detected. However, a stable binary complex formed between IFN -beta -1a and IFNAR2 . Analysis of binary complex formation using various molar excesses of IFN- beta -1a and IFNAR2 indicated that the complex had a 1:1 stoichiometry, and reducing SDS-PAGE of the binary complex treated with the cross-linking reagent dissucinimidyl glutarate (DSG) indicated that the major cross-linked species had an apparent Mr consistent with the sum of its two individual components. Gel filtration of a mixture of IFNAR1 and the IFN-beta -1a/IFNAR2 complex indicated that the three proteins formed a stable ternary complex. Analysis of ternary complex formation using various molar excesses of IFNAR1 and the IFN-beta -1a/IFNAR2 complex indicated that the ternary complex had a 1:1:1 stoichiometry, and reducing SDS-PAGE of the ternary complex treated with DSG indicated that the major cross-linked species had an apparent Mr consistent with the sum of its three individual components. We conclude that the ternary complex forms by the sequential association of IFN-beta -1a with IFNAR2 , followed by the association of IFNAR1 with the preformed binary complex. The ability to produce the IFN-beta -1a/IFNAR2 and IFN- beta -1a/ IFNAR1 / IFNAR2 complexes make them attractive candidates for X-ray crystallography studies aimed at determining the molecular interactions between IFN beta -1a and its receptor .

7/3,AB/8
DIALOG(R)File 154:MEDLINE(R)

09864288 99160899
Formation of a uniquely stable type I interferon receptor complex by interferon beta is dependent upon particular interactions between interferon beta and its receptor and independent of tyrosine phosphorylation.
Russell-Harde D; Wagner TC; Perez HD; Croze E
Department of Protein Biochemistry, Department of Immunology, Berlex Biosciences, Richmond, California 94804, USA.
Biochem Biophys Res Commun (UNITED STATES) Feb 16 1999, 255 (2) p539-44, ISSN 0006-291X Journal Code: 9Y8
Languages: ENGLISH
Document type: JOURNAL ARTICLE
Human type I interferons (IFN) require two receptor chains, IFNAR1 and IFNAR2c for high affinity (pM) binding and biological activity. Our previous studies have shown that the ligand dependent assembly of the type I IFN receptor chains is not identical for all type I IFNs. IFNbeta appears unique in its ability to assemble a stable complex of receptor chains, as demonstrated by the observation that IFNAR2c co-immunoprecipitates with IFNAR1 when cells are stimulated with IFNbeta but not with IFNalpha. The characteristics of such a receptor complex are not well defined nor is it understood if differential signaling events can be mediated by variations in receptor assembly. To further characterize the factors required for formation of such a stable receptor complex we demonstrate using IFN stimulated Daudi cells that (1) IFNAR2c co-immunoprecipitates with IFNAR1 even when tyrosine phosphorylation of receptor chains is blocked with staurosporine, and (2) IFNbeta1b but not IFNalpha2, is present in the immunoprecipitated receptor complex. These results demonstrate that the unique IFNbeta induced assembly of type I IFN receptor chains is independent of receptor tyrosine phosphorylation and the recruitment of additional proteins to the receptor by such events. Furthermore, the presence of IFNbeta1b in the immunoprecipitated IFN receptor complex suggests that IFNbeta interacts and binds differently to the receptor than IFNalpha2. These results suggest that the specific assembly of type I IFN receptor chains is ligand dependent and may represent an early event which leads to the differential biological responses observed among type I IFNs. Copyright 1999 Academic Press.

7/3,AB/42
DIALOG(R)File 154:MEDLINE(R)

08456288 96075707
Characterization of a domain of a human type I interferon receptor protein involved in ligand binding.
Eid P; Tovey MG
Laboratory of Viral Oncology, CNRS, Villejuif, France.
J Interferon Cytokine Res (UNITED STATES) Mar 1995, 15 (3) p205-11, ISSN 1079-9907 Journal Code: CD4
Languages: ENGLISH
Document type: JOURNAL ARTICLE
Two monoclonal antibodies that recognize different epitopes of the extracellular domain of one of the proteins that constitute the type I interferon receptor were used to delineate the interferon binding site. Antibody 64G12 both inhibits the binding of radiolabeled interferon-alpha 2 and IFN- alpha 8 to their cell surface receptors and neutralizes the antiviral and antiproliferative actions of all the type I interferons tested, including IFN-beta , IFN-omega, and human leukocyte IFN, a mixture of different interferon- alpha isotypes. Antibody 34F10 recognizes the type I interferon receptor with an affinity similar to that of the MAb 64G12 but does not inhibit either the binding or the biologic activity of any of the type I interferons tested. Both antibodies recognize a protein of 105 +/- 5 kD from either Daudi or Ly28 cells. Immunoprecipitation following surface iodination demonstrated that the neutralizing MAb recognizes a protein of 105 kD and the nonneutralizing MAb a protein of 110 kD in extracts of Daudi cells. A second less intense band was also detected by both antibodies. Cross-linking of IFN -alpha 2 to its receptor before immunoprecipitation prevented the neutralizing antibody from immunoprecipitating the receptor protein, but the nonneutralizing MAb was still able to recognize a 140 kD protein corresponding to the cross-linked interferon -receptor protein complex . Thus, an interferon binding domain appears to be localized in a region between amino acids 23 and 229 of the extracellular domain of a transmembrane protein that forms part of the type I interferon receptor complex containing the epitopes recognized by each antibody.